

THE RECENT NORTH-EASTWARD SPREAD OF THE
ORANGE SULPHUR BUTTERFLY, *COLIAS*
EURYTHEME BOISDV. (LEPIDOPTERA).

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In bygone days when the senior author used to collect butterflies in New Hampshire and later in Connecticut, he neither collected nor saw the orange sulphur butterfly, yet in 1932 this was a common species in both states. The distribution given in some of the publications is as follows: Morris, Synopsis of Lepidoptera of North America, 1862, "California, Mexico and some of the States"; Scudder, Butterflies of New England, 1889, records this butterfly as a western species and gives a half page of localities, ending with the following paragraph: "Single specimens have also been taken a few times in New England, namely, in Norwich, Conn. (McCurdy); Wollaston (F. H. Sprague) and Belmont, Mass. (Maynard); Montpelier, Vt. (P. S. Sprague) and Mt. Desert, Me., a single specimen seen (Thaxter)"; French, Butterflies of the Eastern United States, 1890, "Western States to the Pacific; occasionally in Middle States to Massachusetts"; Blatchley, Butterflies of Indiana, 1891, two forms of *eurytheme* "occur occasionally in various parts of the State, but are nowhere common." "Food plant, white and buffalo clover"; Beutenmüller, Butterflies of the Vicinity of New York, 1893, "A single pair of this species was taken by the late S. L. Elliot at Astoria, Long Island"; Dyar, List of Lepidoptera, 1902, "Rocky mountains, Pacific States"; Comstock, How to Know the Butterflies, 1904, "The species is most abundant in Mississippi Valley, but it is found on the Pacific coast and also along the Atlantic coast as far as Maine"; Smith, Insects of New Jersey, 1910, "very occasional and hardly a regular inhabitant of the State. It is common in the Central States"; Weed, Butterflies, 1917, states that is rarely found north of latitude forty degrees; Elrod in Butterflies of Montana, 1906, says "It extends from the Atlantic to the Pacific, and from Canada to the far south, though it is rare in the south," and Montana records are given. Holland's Butterfly Book (both editions) gives a similar range for *eurytheme* but says it is rare "in the lower parts of Florida and Texas in the hot lands."

From Canadian Entomologist, we learn that Dr. Bethune captured a specimen in 1871, at Sault Ste. Marie, after a difficult chase, and he describes the flight habits of this butterfly in con-

trast with those of *philodice*; that Pearson collected a specimen in Montreal, in 1875; that Sprague captured a specimen at Wollaston, Mass., October 8, 1879; in recent years according to Bulletin Brooklyn Entomological Society, Carroll collected this butterfly in Brooklyn, N. Y., in 1914 and 1918; and from Journal of the New York Entomological Society, Shoemaker took it in New York, in 1916; on Saten Island, Ragot took it in 1925, and W. T. Davis in 1927; Watson reported it as fairly abundant around New York City in 1927, and as common in 1930; Klots mentioned the abundance of this species at Ithaca, N. Y., in August, 1928, and Brower captured several specimens there in July and September, 1930.

Leonard's List of the Insects of New York (1928), gives ten localities from Long Island to Rochester, at two of which it is "reported fairly common." Saunders in Butterflies of the Allegany State Park (New York), 1932, states that this butterfly is of regular occurrence in the park and is not uncommon.

According to Clark, Butterflies of the District of Columbia, 1932, this species was rare in the vicinity of Washington, until a few years ago. In 1925, it was occasional in certain meadows "the greatest number seen in one day was three." Since then it has been much more common, and in 1930, both sexes of *eurytheme* outnumbered the corresponding sexes of *philodice*. Mr. Clark captured or observed the orange sulphur in eastern Massachusetts at Ipswich, August 25, 1925, and August 28, 1930; Essex, August 30, 1925; Newton, August 25, 1930.

Eurytheme is not included in Fernald, Butterflies of Maine, 1884; McIntosh, Butterflies of New Brunswick, 1899; Fiske, Butterflies of New Hampshire, 1901; Davis, Illustrated Catalogue of Butterflies of Lackawanna County, Pa., 1915; or Britton, Check-List of the Insects of Connecticut, 1920, although some Connecticut records have since come to hand.

In Entomological News, Vol. XXXVII, p. 97, 1926, Roswell C. Williams published a list of butterflies collected at Avon, Conn., where he spent from two to four week-ends each summer from 1902 to 1914, but *C. eurytheme* is not included and probably was not taken or observed by him.

On October 14, 1930, a specimen of *eurytheme* was received at the Experiment Station collected at Fairfield, by Aretas A. Saunders. On October 13, 1930, J. R. Haskin (see Ent. News, xlii, 201) collected a female *eurytheme* at Waterford. On October 3, 1931, the junior author collected two males and a female in the clay pit of a brick yard at Berlin, and in 1932 he

collected the species at Berlin, Cheshire, Goshen, Hamden, Milldale, New Haven, New London, Plainville, Plantsville, Old Saybrook, Torrington and West Haven. In 1932, the senior author collected a male at North Branford, July 24; D. S. Lacroix collected a female specimen at Windsor, August 7; J. P. Johnson collected a female specimen at Nichols, October 4; and J. C. Schread picked up a dead female specimen on the sidewalk near the Experiment Station, November 4. On August 5, the senior author observed a specimen in flight when driving through Morse Street, Hamden, and on August 8 he saw a brilliant specimen flying over the New Haven Green.

When on vacation, the senior author, September 23, 1932, collected a male and female in Surry, New Hampshire, about two miles north of the village. He also saw this butterfly in flight at the village, on Mine Hill about four miles southwest of the village and on the hills some four miles north of the village near the Alstead line. The first week in October he saw an orange butterfly flying over a field in Unity about six miles south of Claremont.

A. E. Brower, *Jour. N. Y. Ent. Soc.*, Vol. XL, p. 510, 1932, reports that five females and one male were collected at Bar Harbor, Mt. Desert Island, Maine, in August and September, 1932. Three specimens were taken and three others seen in July and August in the vicinity of Lincoln and Enfield in the Penobscot Valley. Two specimens were observed in southeastern Maine near Northfield about 20 miles from the New Brunswick border.

Professor C. P. Alexander writes that he observed two or three specimens of this butterfly flitting over fields of legumes on the College farm at Amherst, Mass., on August 14, 1932.

The valley of the Connecticut River above Middletown, Conn., and of that portion of the Quinnipiac River which at one time doubtless was the lower valley of the Connecticut, has large deposits of excellent brick clay which have been worked for a great many years. Many pits still are being worked; others, for one reason or another, have been abandoned. Occurring in low ground, the majority require pumping, and as soon as this is stopped fill up with water, but there are some localities where the evaporation is sufficient to dispose of the inflow, and of this character are many of the pits about Berlin, some 26 miles north of New Haven.

Like many other similar spots the low ground of Berlin seems to be of much higher average summer temperature than the surrounding broken country, while the deep pits afford unusual

shelter from the wind. On various occasions the junior author has found butterflies apparently at home in these pits although when seen elsewhere in the territory they behaved as strays. When, therefore, on August 3, 1931, a small deep-orange-colored butterfly was seen at Berlin, fighting with a male roadside yellow, he was overjoyed at seeing, as he supposed, an old friend of his childhood in southern Ohio: *nicippe*. In fact he was so delighted that he threw caution to the winds, and once more learned how easily a two-inch butterfly can evade a fourteen inch diameter net. *Nicippe*, however, had been remembered as a rather lazy flyer, and the powerful, erratic flight of this Berlin butterfly was rather surprising. At that, however, it did not act like an accidental visitor, but flew across the clover field in which it first had been seen, into one of the pits at the nearest point as if it knew just where to go.

Opportunity did not offer to get to Berlin again until on October 3, but on that date, in the dry pit into which the supposed *nicippe* had fled, two males and a female which proved to be *eurytheme*, were seen and taken, while a faded creature which escaped had what later proved to be very characteristic of the species: a vigorous erratic flight markedly different from that of the roadside yellow.

The junior author always has been greatly interested in the out-of-doors. As a small boy he actively collected butterflies in southern Ohio; when, therefore, during the period from 1909 to 1915 he again collected with his two boys, in Connecticut, he had a background to help him recognize any southern forms, as well as to assist him in field recognitions, and while an unhappy experience with pests which destroyed practically the entire collection somewhat dulled his enthusiasm, he kept fitful notes until discussion with the senior author regarding the butterflies of New Haven led him again to active collecting. The fact, therefore, that up to August 3, 1931, he had neither noticed nor heard of any record of a butterfly so characteristic—at least, in the orange form—as *eurytheme*, while no real proof, warrants as reasonable the inference that during that earlier period the butterfly at least was uncommon, for so far as we have been able to learn, the junior author's records for 1931 are unique. What occurred in 1932, therefore, is little short of astounding, and can best be described as an explosion of the species.

Berlin furnished the first record, a single male, on June 5; on July 2, however, at Cheshire, it was almost as common as the roadside yellow, and by the middle of that month over certain

fields of clover and of alfalfa in that locality it was appreciably more numerous. An appended table gives the record for the year, and it is to be noted that except for the Berlin cases, these records were made incidental to business or other trips, and not at all as the result of special or systematic efforts. By August the butterfly seemed pretty generally distributed through the southern half of the state; August 9 it was common at Goshen, in the northwest corner; September 18 four specimens were taken at Simsbury, near northerly boundary at the center line of the state; October 2 it was common at Granby, at the center of the north boundary, and on October 4 it was common at Bennington, Vermont. The last record for the season was at Westville, a westerly section of New Haven, where it had been present most of the summer, a single specimen being seen on October 25.

It should be remembered that these records are random ones; it is entirely possible that *eurytheme* was common at the points named at much earlier dates without having been recorded, as the 1932 records for Surry, New Hampshire, and Amherst, Massachusetts, given in the earlier section of this paper would indicate. It is interesting, too, to note that while Mr. Williams saw no specimen at Avon, Connecticut, in 1926, the junior author found it there on three occasions in September, 1932, and that on the 10th of that month it was common.

The orange form is so noticeable from its coloration that there is little reason to suppose it has heretofore escaped the many nature students of the territory, and while on the score of coloration alone the paler forms might well have been mistaken for the roadside yellow, the flight is so different from that of its common relative that it would seem that no good observer could fail to note it. At the same time, there is the fact that with the exception of Dr. Bethune at Sault Ste. Marie in 1871, no one until very recently seems to have commented on this peculiarity of the species.

Just what is this difference in flight, while very obvious to the eye, is not easy to describe, for what may be termed the flight patterns are very similar, but there is a vigor and determination at all times on the part of *eurytheme* that is absent in the case of *philodice*, even when in frightened flight.

It will be very interesting to see if this robust and thriving butterfly does not crowd out the roadside yellow, just as the European cabbage butterfly has replaced our native species.

Some occurrences of the *eurytheme* in Connecticut and to the northward:

August	3, 1931	Berlin,	Connecticut	1
October	3, 1931	"	"	3
June	5, 1932	"	"	1
July	2, "	Cheshire	"	Common
"	3, "	*Westville	"	1
"	10, "	Berlin	"	Common, faded
"	14, "	*West Rock	"	1
"	16, "	Milldale	"	Common
"	17, "	*Hamden	"	"
"	21, "	Berlin	"	"
"	24, "	Plantsville	"	1
"	31, "	*Westville	"	1
August	1, "	* "	"	1
"	4, "	Old Saybrook	"	1
"	4, "	New London	"	3
"	9, "	Torrington	"	2
"	9, "	Goshen	"	Common
"	11, "	*Westville	"	2
"	11, "	New Haven Green	"	1
"	11, "	*West Haven	"	1
"	11, "	*Woody Crest	"	3
"	13, "	* " "	"	3
"	17, "	Plainville	"	Very Common
"	17, "	Farmington	"	Common
"	20, "	"	"	"
"	22, "	*Westville	"	1
"	25, "	* "	"	1
September	5, 1932	Avon	"	2
"	5, "	*West Rock	"	1
"	10, "	Avon	"	Common
"	14, "	*Hamden	"	4
"	15, "	*Westville	"	1
"	17, "	* "	"	1
"	17, "	*Centerville	"	Common
"	18, "	Avon	"	4
"	18, "	Simsbury	"	4
"	23, "	*Westville	"	3
"	25, "	Simsbury	"	Common
October	2, "	Granby	"	"
"	4, "	Bennington,	Vermont	"
"	9, "	Cheshire,	Connecticut	"
"	9, "	Milldale	"	Very Common

"	15,	"	*Westville	"	1
"	15,	"	Tariffville	"	1
"	15,	"	Congamond,	Massachusetts	3
"	25,	"	*Westville,	Connecticut	1

* Very close to, or suburb of, New Haven.

Rating scheme.

<i>Very Common</i>	10 or more to be seen in course of an hour.
<i>Common</i>	5 or 6 to be seen in the course of a morning or an afternoon.
<i>Not Uncommon</i>	1 or 2 to be seen in the course of a day.
<i>Uncommon</i>	2 or 3 to be seen in the course of a season.
<i>Rare</i>	Not more than 1 on an average to be seen in the course of a season.
<i>Accidental</i>	Not found oftener than once or twice in 5 or 6 years.

***Xenorhipis brendeli* Lec. from Long Island. (Coleoptera-Buprestidae)**—There occurs in the New York State List of Insects but a solitary record (Brooklyn, L. I. [Horn]) for this interesting species which Mr. A. S. Nicolay remarks as "probably the rarest of our eastern buprestids." The larva is listed by Dr. Felt as occurring in oak, while Dr. Fisher here records the larva from hickory. During the summer of 1929 a single female specimen of a buprestid species was taken on the trunk of a beech tree in Flushing; it was subsequently determined by Dr. W. S. Fisher of the U. S. National Museum as *Xenorhipis brendeli* Lec. In Dr. Fisher's reply letters he mentions that the National Museum has specimens from Texas and South Carolina, and material reared from dead hickory limbs collected in North Carolina. These localities give some idea, when supplemented with Illinois as mentioned in Blatchely's *Coleoptera of Indiana*, of the interesting and wide range of the species. The Flushing specimen here recorded is now in the collection of the U. S. National Museum.—K. W. COOPER, Flushing, L. I.